CORE2025

CONFERENCE ON RAILWAY EXCELLENCE

Kaitiaki - Guarding the Future | **12 - 14 August 2025**

Tāmaki Makaurau | Aotearoa | Auckland | New Zealand

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LESSONS FROM CANADA: Drivers of High Construction Costs and Their Impacts

UNIVERSITY OF TORONTO

NYU Marron Institute of Urban Management

Jedwin Mok, University of Toronto
Dr. Marco Chitti, NYU Marron Institute
Dr. Amer Shalaby, University of Toronto

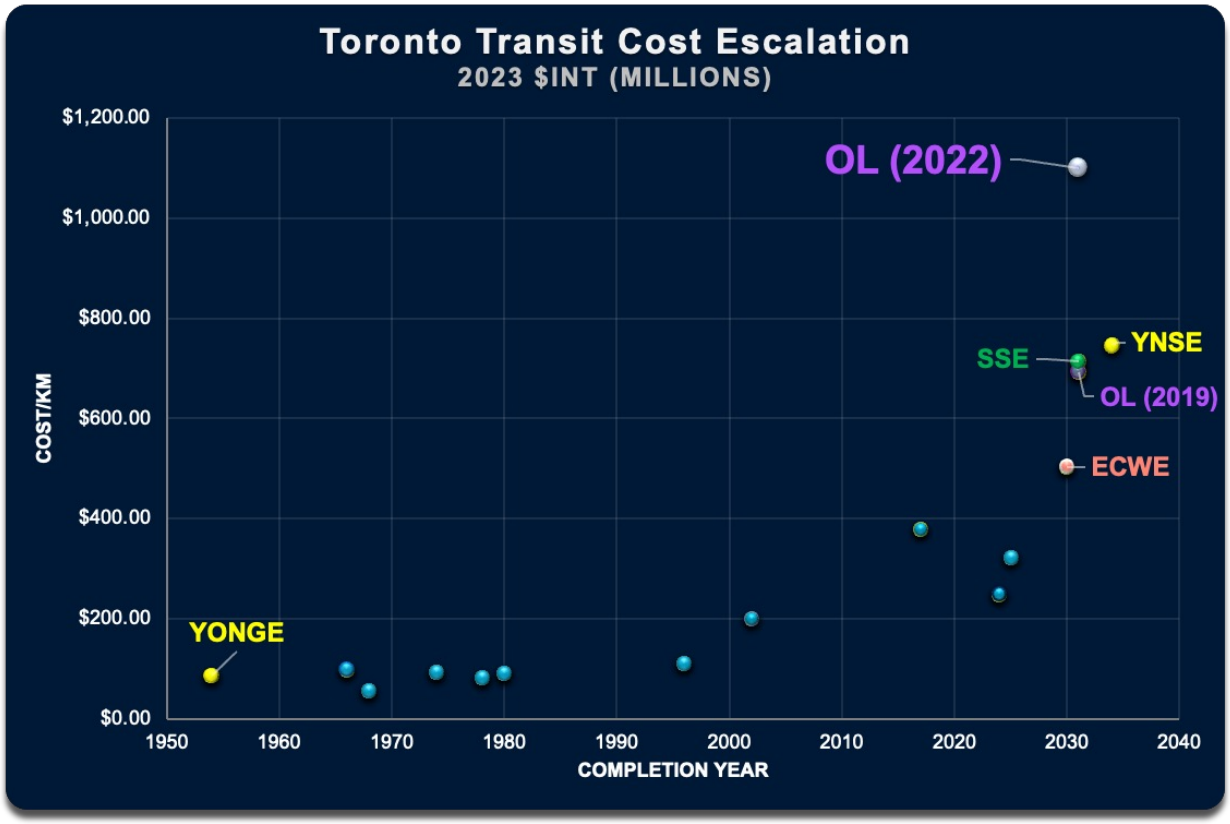
Canada and Australasia are experiencing a **boom** in rail rapid transit expansion.

Sydney Metro City & SW
INT$ **400M**/km

Toronto Ontario Line
INT$ **1100M**/km

Paris Line 15
INT$**190M**/km

RAPID COST ESCALATION



*Historical cost data sourced from Stephen Wickens and RCCAO Ontario (Wickens, 2021).

1954: Yonge Subway
INT$ **86M**/km

2030: Ontario Line (2022 est.)
INT$ **1.1B**/km

ARE HIGH COSTS INEVITABLE?

2017 [20km]
CAD $4.65B

2024 [10km]
CAD $6.24B

Global NEWS

Calgary city council shortens Phase 1 of Green Line LRT with new $6.2B cost

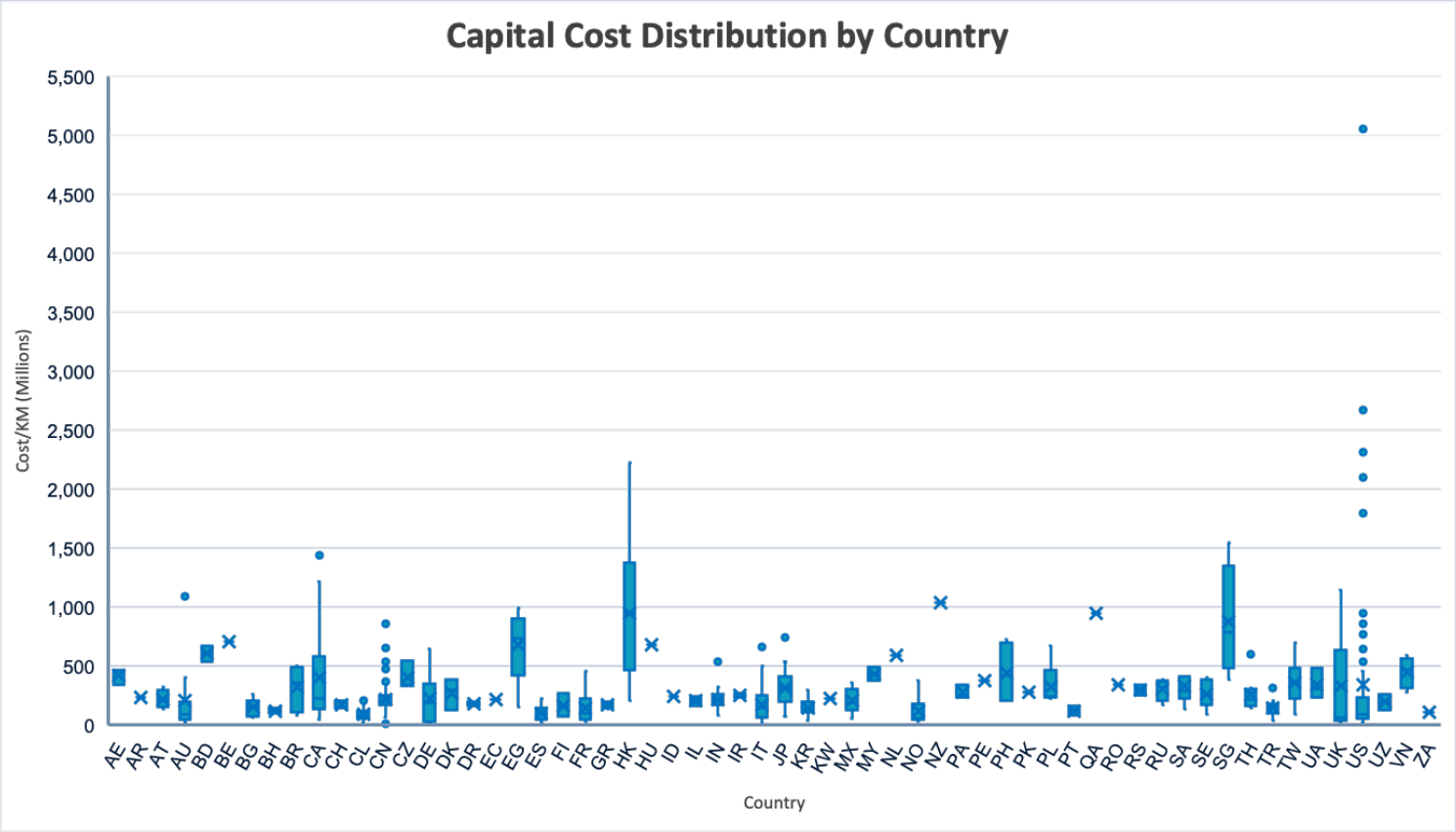
"The strategy to build LRT projects in Calgary in phases makes even more sense now with cost pressures on all infrastructure projects... **It never gets cheaper to build major infrastructure projects.**"

- City of Calgary

NO, OF COURSE NOT!

Surface Tramways	 **Finch West LRT, Toronto** INT$ 248M/km	 **L2/L3, Sydney** INT$ 201M/km
Automated, Fully Grade-Separated Metro	 **M5, Istanbul** INT$ **130M**/km	 **Brescia Metro, Brescia** INT$ **96.2M**/km

GLOBAL BENCHMARK


Capital Cost Distribution by Country
Cost/KM (Millions)
5,500
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
AE AR AT AU BD BE BG BH BR CA CH CL CN CZ DE DK DR EC EG ES FI FR GR HK HU ID IL IN IR IT JP KR KW MX MY NL NO NZ PA PE PH PK PL PT QA RO RS RU SA SE SG TH TR TW UA UK US UZ VN ZA
Country

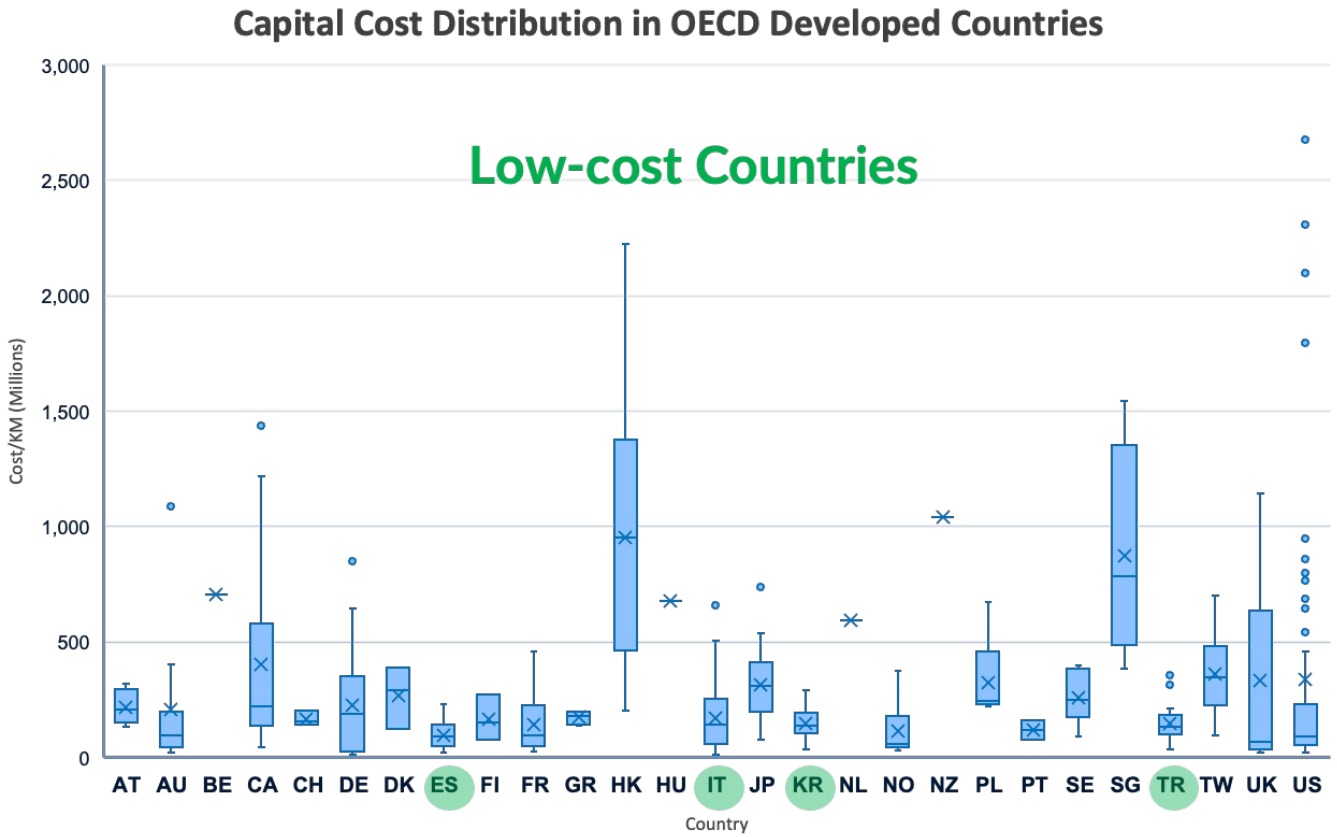
- **1083 Rail Transit projects** (LRT, Metro, Regional Rail) across **60 countries** between **1971-2036** (projected)
- **Adjusted for Inflation + PPP** [2023 $INT] to allow comparability

TRANSIT COSTS PROJECT

Eno Center for Transportation

*Global transit cost data sourced from Transit Costs Project and Eno Center for Transportation.

IS IT AUTHORITARIANISM OR GDP?

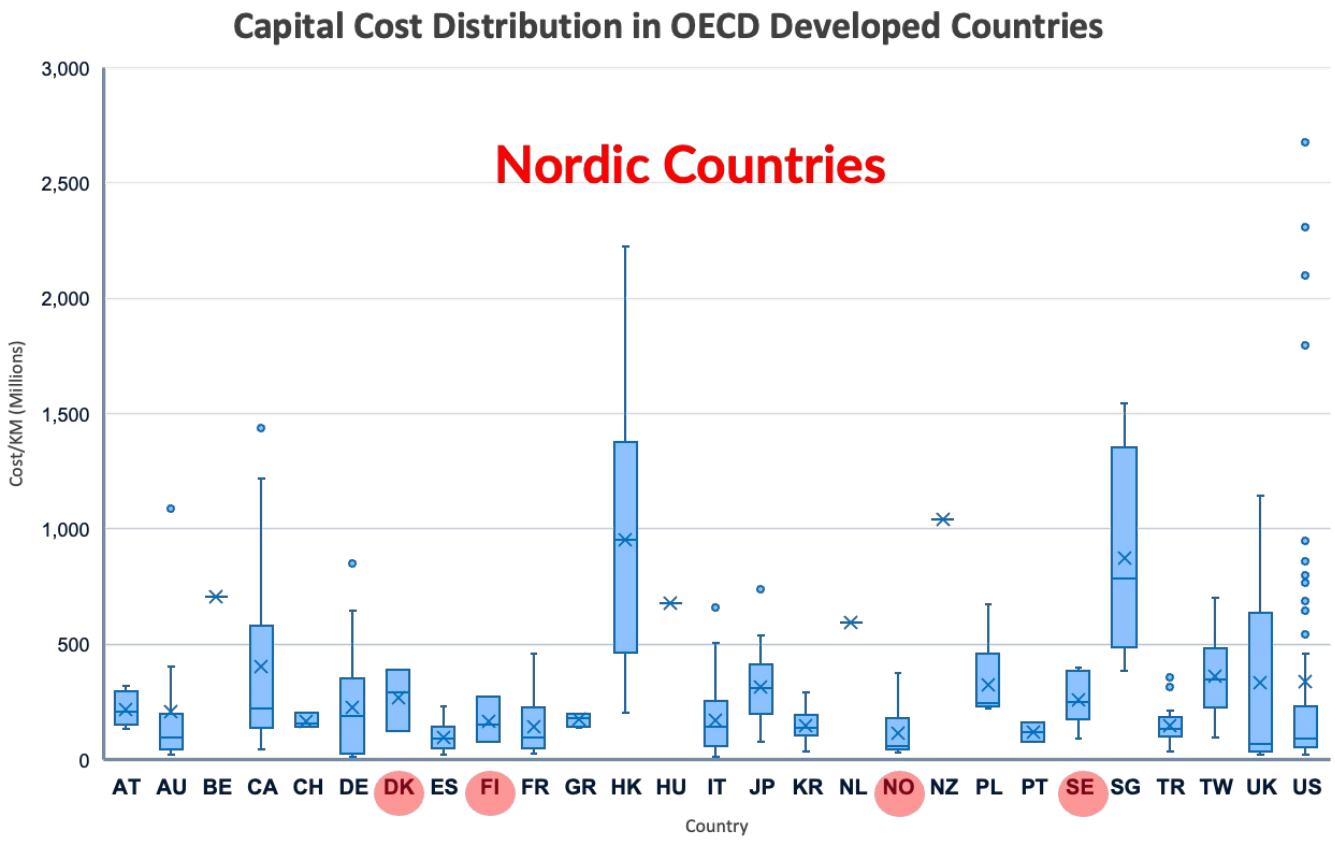


Shinbundang Line, South Korea
INT$ **148.8M**/km

Brescia Metro, Italy
INT$ **96.2M**/km

*Global transit cost data sourced from Transit Costs Project and Eno Center for Transportation.
**NYC East Side Access Excluded ($5.05B/km)

IS IT COST OF LIVING OR LABOUR?

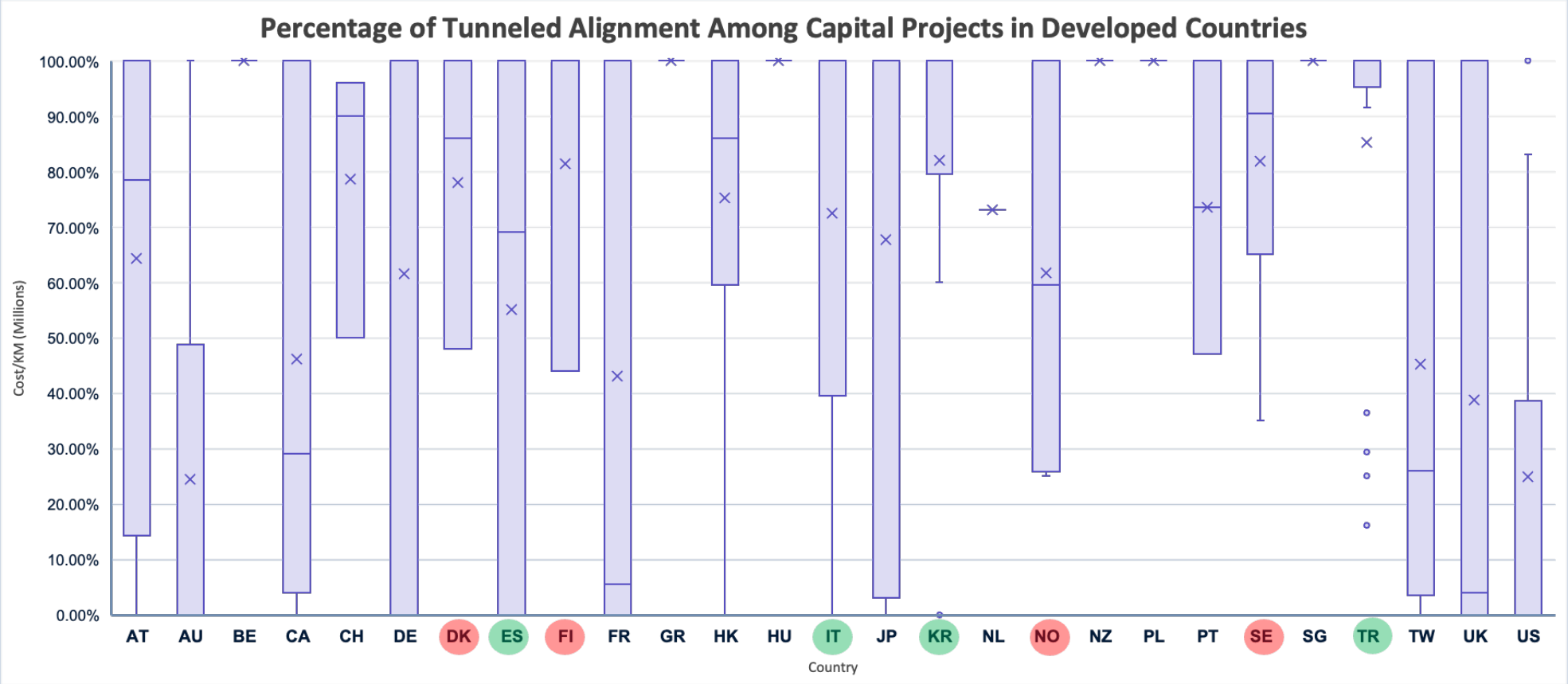


Länsimetro, Finland
INT$ **147.5M**/km

Cityringen, Denmark
INT$ **290.9M**/km

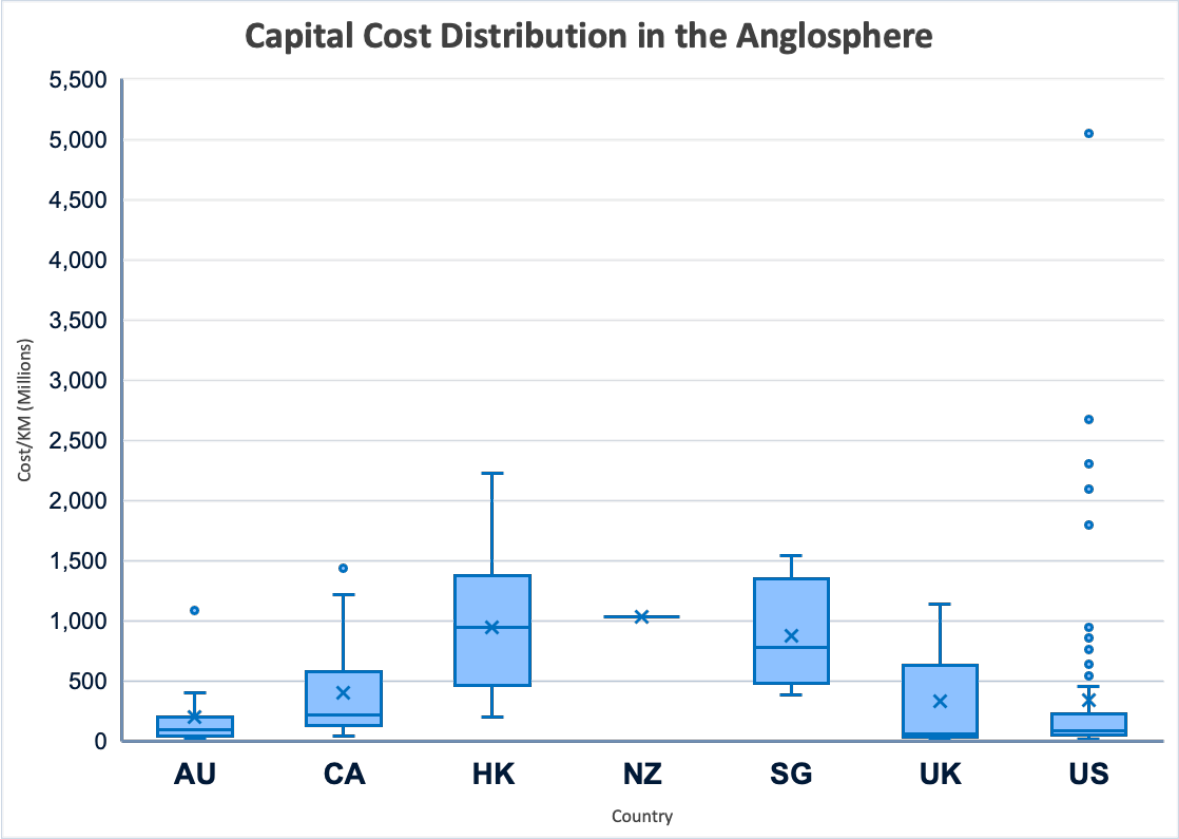
*Global transit cost data sourced from Transit Costs Project and Eno Center for Transportation.
**NYC East Side Access Excluded ($5.05B/km)

IS IT PROJECT COMPLEXITY?



*Global transit cost data sourced from Transit Costs Project and Eno Center for Transportation.

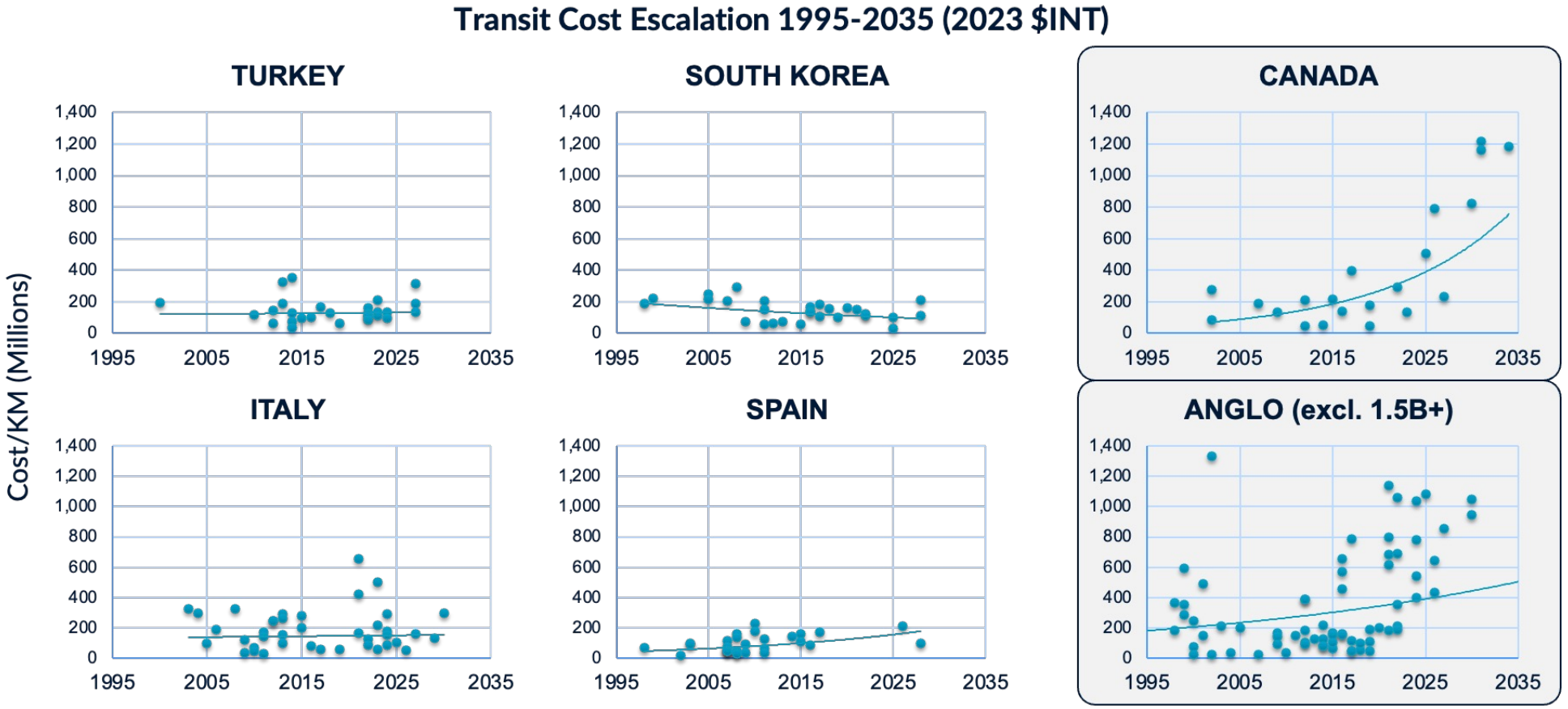
THE ENGLISH-SPEAKING WORLD



*Global transit cost data sourced from Transit Costs Project and Eno Center for Transportation.

Every country with a **transit project** over **$1B/km** speaks **English** as its primary language.

THE ENGLISH-SPEAKING WORLD



*Global transit cost data sourced from Transit Costs Project and Eno Center for Transportation.

EMBRACING GLOBAL BEST PRACTICES

SEOUL, KR

ISTANBUL, TR

"Because the greatest innovation in high-quality, low-cost public works is not… really in any country where English is the primary language, [North] American governments should maintain **global curiosity**" **(Levy, 2021a).**

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What Drives Cost?

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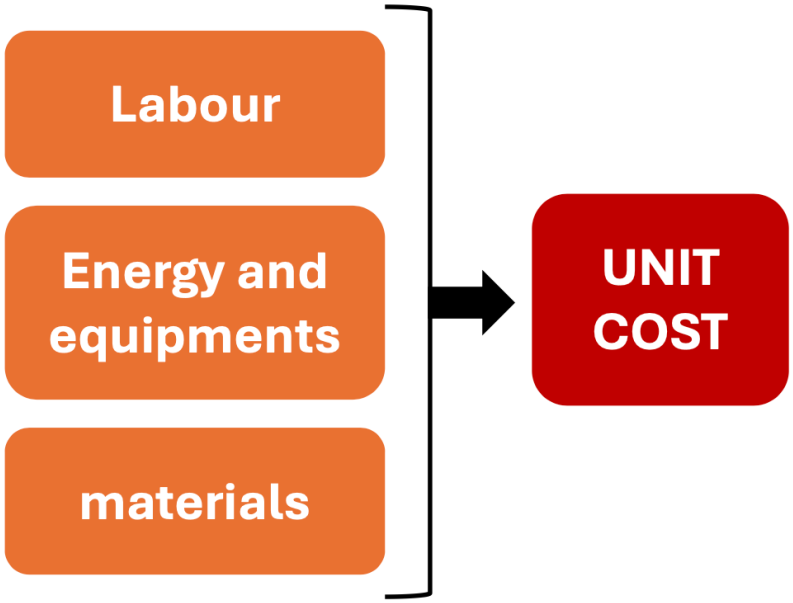
Findings from **Mok et al.**, 2024
Goldwyn et al., 2023
Aevaz et al., 2022
Wickens, 2020

1. We pay more for the same.



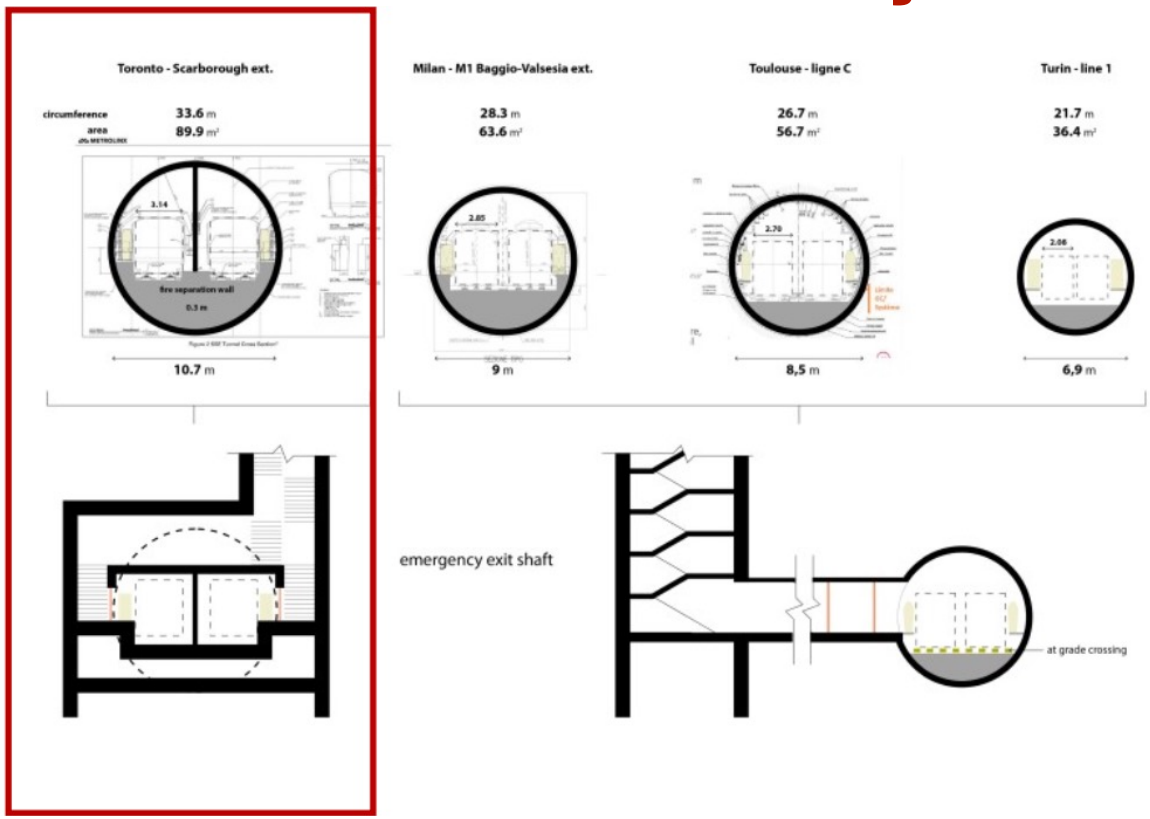
2. We build more than is necessary.

Labour

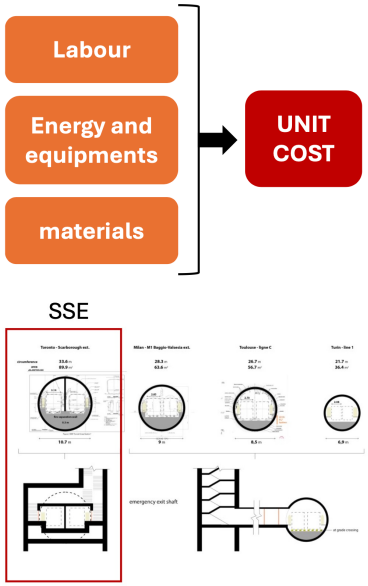
Energy and equipments

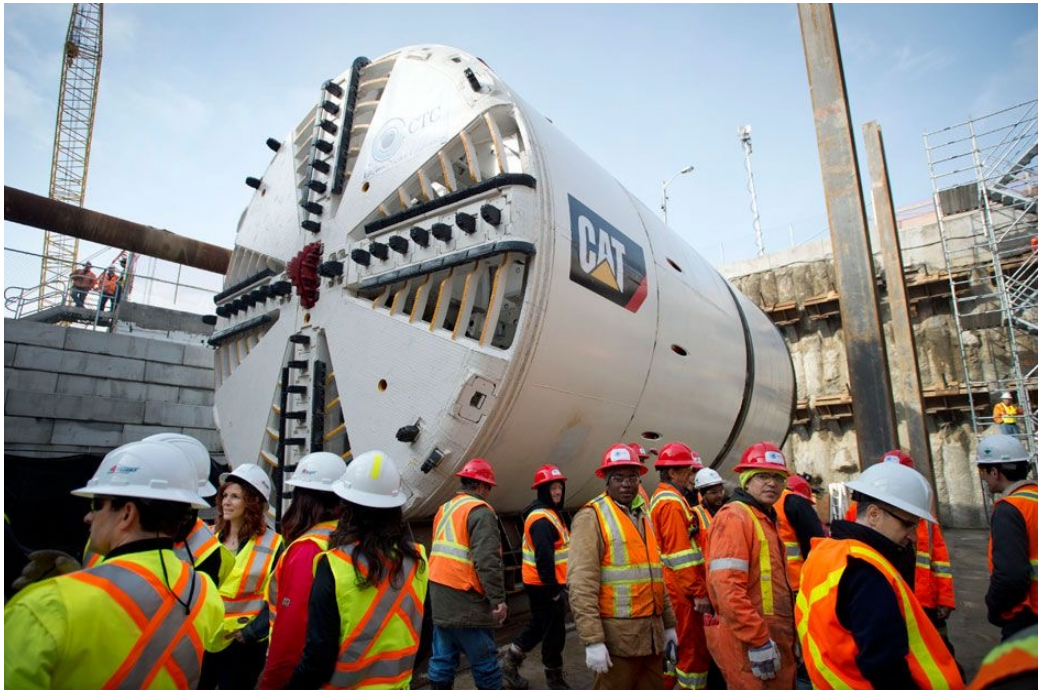
materials

→ UNIT COST

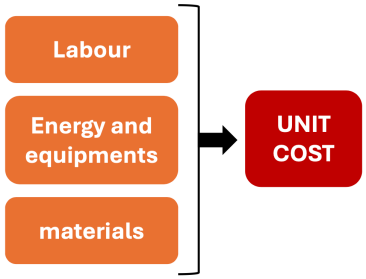


3. Our institutions are bleeding knowledge.

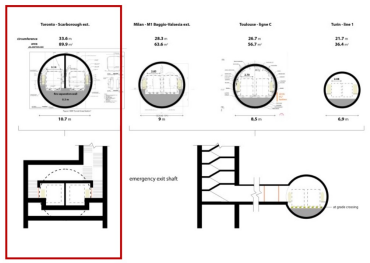


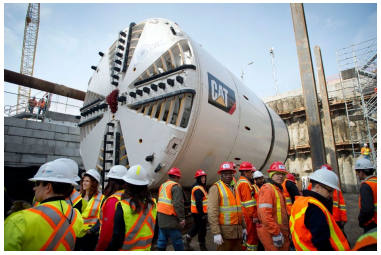


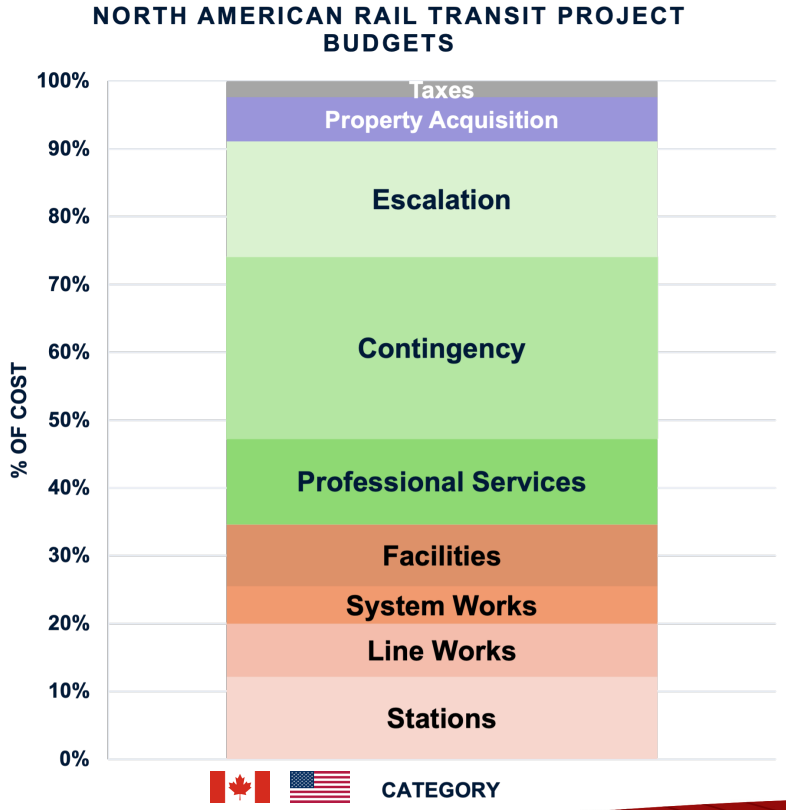
4. We pad project budgets.



SSE







High costs result from compounding factors.

Labour

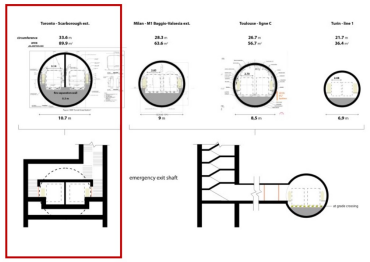
Energy and equipments

materials

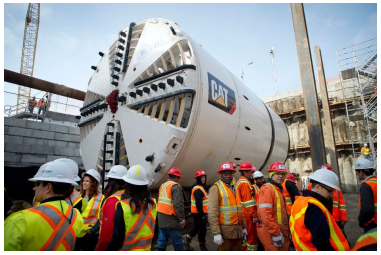
→ UNIT COST

x

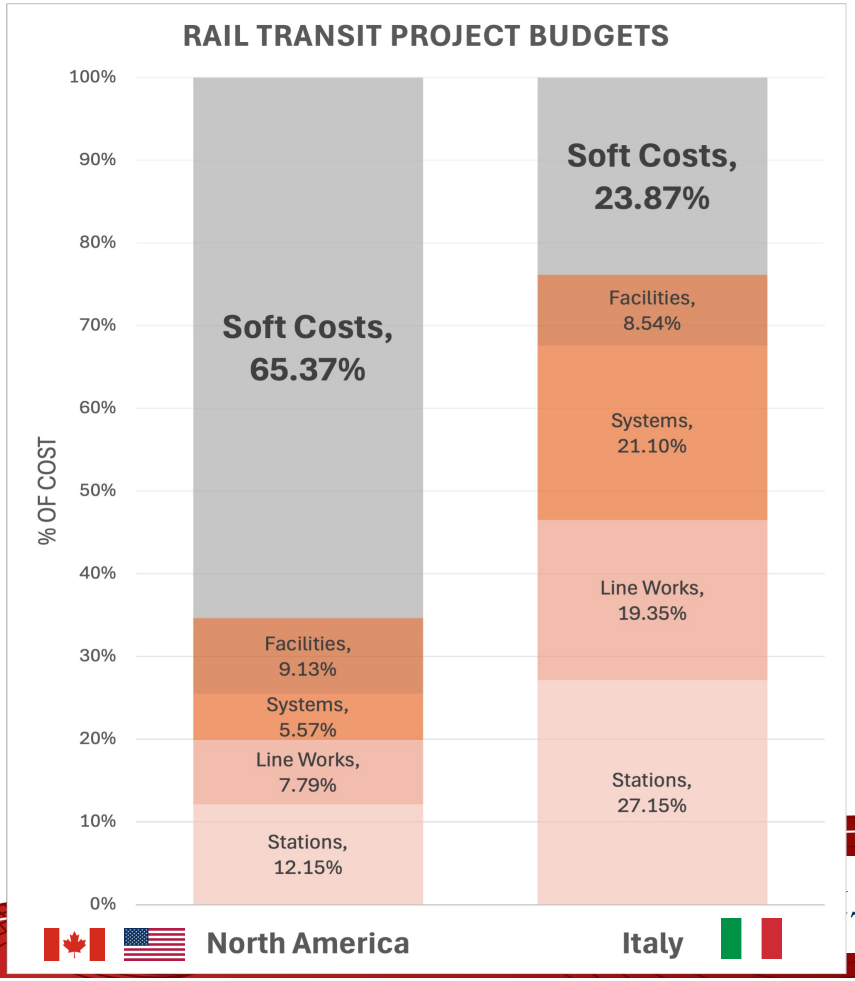
SSE



x



x



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Three Lessons from Canada

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1. The state must have adequate expertise to be an **informed buyer.**

Know what you want.

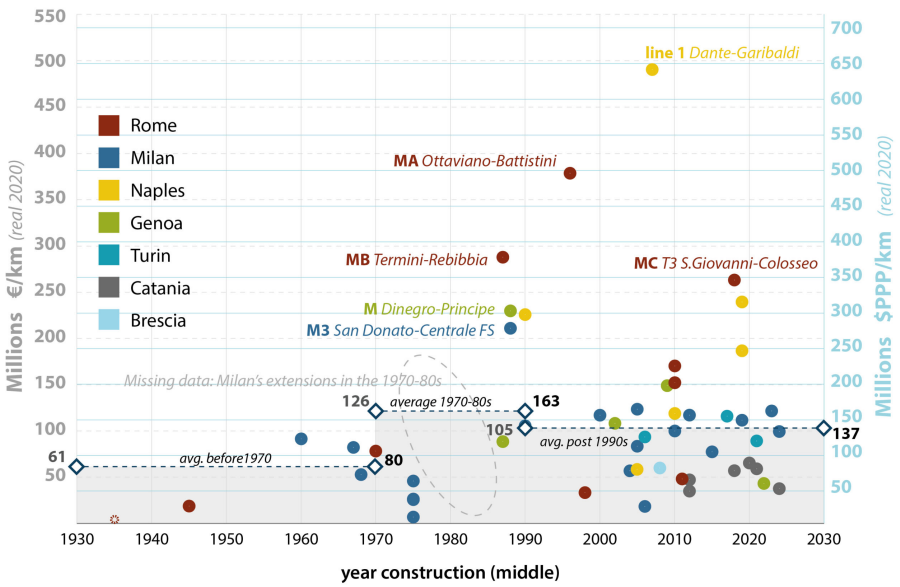
How Metrolinx's plan to deliver European-style train service went off the rails

GO Expansion will still transform Greater Golden Horseshoe transit — but likely won't be as ambitious as what was planned just three years ago

Jack Hauen
Jun 10, 2025 1:04 PM

Scope of Work, **Scope** of Work, **Scope** of Work…

2. Be **transparent** and **standardize** to maintain a competitive market & reduce risk.



Italian Public Disclosure & Benchmarking

Chinese Standardization

3. Have a **political champion.**

Toronto Yonge North Subway Extension
INT$ **750M**/km

Montreal REM
INT$ **119M**/km

THREE LESSONS FROM CANADA

1. Be an **informed buyer.**

2. Be **transparent** and **standardize.**

3. Have a **political champion.**

WHY COSTS MATTER

Paris Line 15: ~INT$**190M**/km

Ontario Line: ~INT$**1100M**/km

The goal of cost control is **not** to reduce scope; It is to provide better **value** and deliver **more** projects.

WE NEED YOUR HELP!

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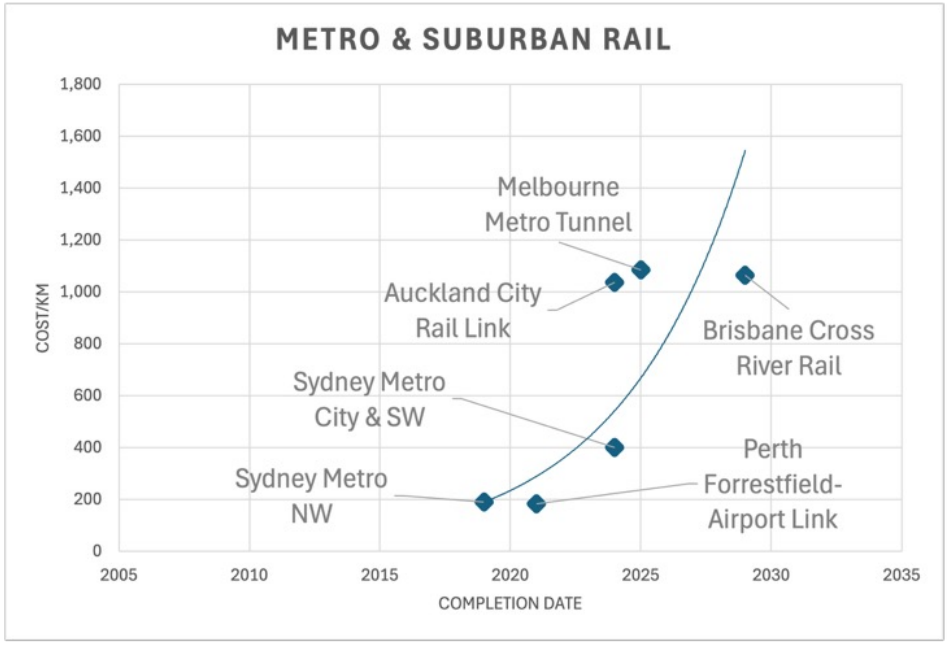
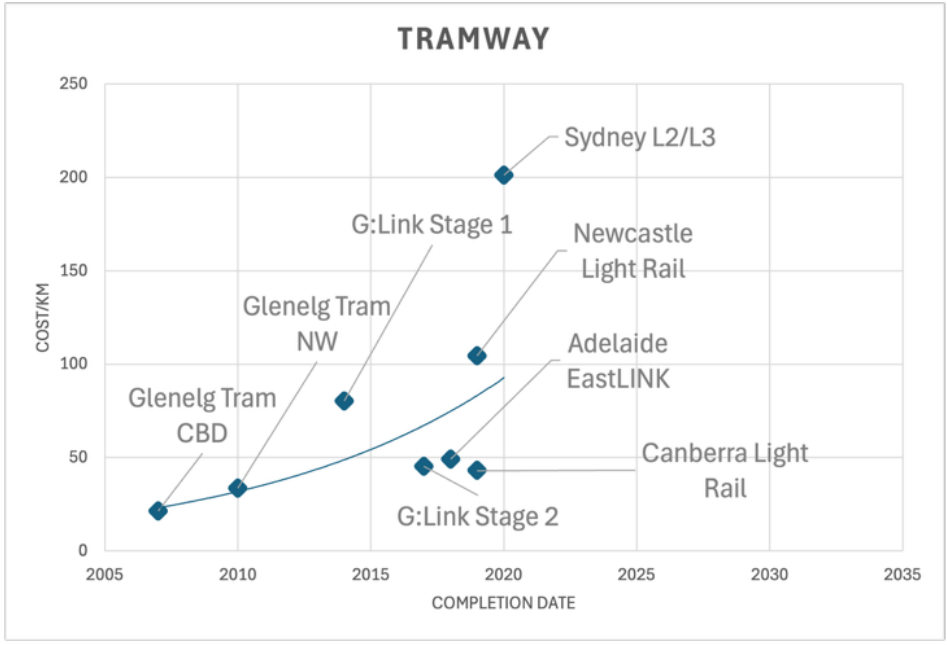
KEY REFERENCES

- Aevaz, R., Eby, B., Lewis, P., & Puentes, R.(2022). Saving Time and Making Cents: A Blueprint for Building Transit Better. Eno Transit Project Delivery Initiative. Eno Center for Transportation. https://projectdelivery.enotrans.org/report/
- Flyvbjerg, B., Bruzelius, N., & Wee, B. V. (2008). Comparison of Capital Costs per Route-Kilometre in Urban Rail. European Journal of Transport and Infrastructure Research.
- Goldwyn, E., Levy, A, Ensari, E., & Chitti, M. (2023). Transit Costs Project: Understanding Transit Infrastructure Costs in American Cities. https://transitcosts.com/final-report/ .
- Wickens, S. (2020). RCCAO Ontario. Station to Station: Why Subway-building Costs Have Soared in the Toronto region.
- Sharma, C., & Chow, J., (2023). Reducing US Transit Costs: An Empirical Review and Comparative Case Study of Portland, Manchester Rail Systems.
- Barone et al., (2018). Building Rail Transit Projects Better for Less. Regional Plan Association.
- Levy, A. (2021a). *So You Want To Do An Infrastructure Package*. Niskanen Center.

APPENDIX


METRO & SUBURBAN RAIL
COST/KM
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
2005
2010
2015
2020
2025
2030
2035
COMPLETION DATE
Melbourne Metro Tunnel
Auckland City Rail Link
Brisbane Cross River Rail
Sydney Metro City & SW
Sydney Metro NW
Perth Forrestfield-Airport Link


TRAMWAY
COST/KM
250
200
150
100
50
0
2005
2010
2015
2020
2025
2030
2035
COMPLETION DATE
Sydney L2/L3
G:Link Stage 1
Newcastle Light Rail
Glenelg Tram NW
Adelaide EastLINK
Glenelg Tram CBD
Canberra Light Rail
G:Link Stage 2